

## CLAIMS

What is claimed is:

- 5           1.       A method for registering an image data set for visualizing internal areas of the body, said method comprising:  
              determining a relative position of (i) an imaging device, and (ii) an external body part associated with an internal area of the body;  
              producing an image data set for the internal area of the body by means of  
10       the imaging device;  
              determining a spatial position of the external body part; and  
              registering or assigning the image data of the internal area of the body according to relative position, with respect to the spatial position of the external body part, on the basis of the relative positional information.
- 15           2.       The method as set forth in claim 1, wherein the relative positions of the imaging device and the external body part are determined in a coordinate system (X, Y, Z) which is fixed with respect to the imaging device.
- 20           3.       The method as set forth in claim 1, wherein determining a relative position of (i) an imaging device, and (ii) an external body part associated with an internal area of the body includes:  
              providing the external body part with markings;  
              moving the imaging device from an initial position into one or more  
25       positions in which the markings appear in a defined position with respect to each other; and  
              recording the movement of the imaging device.
- 30           4.       The method as set forth in claim 3, wherein the markings are attached to the external body part such that they appear in one viewing direction in a linear arrangement.

5. The method as set forth in claim 3, wherein the markings are attached to the external body part such that they appear in one viewing direction to be covering each other.

5 6. The method as set forth in claim 3, wherein the spatial position of the external body part is determined by means of the markings of the external body part using a medical tracking system.

7. The method as set forth in claim 3, wherein the movement of the  
10 imaging device is recorded on the basis of at least two angles which define at least two positions which are different from each other, in which the markings appear in a defined position with respect to each other.

8. The method as set forth in claim 1, wherein the image data set is  
15 represented visually from a viewing direction from which an observer looks onto the internal area of the body.

9. The method as set forth in claim 8, wherein the viewing direction of the observer is determined by means of a medical tracking system.

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10. The method as set forth in claim 1, wherein the image data is represented visually from a direction of an instrument pointed at the internal area of the body.

25 11. The method as set forth in claim 10, wherein the instrument is a microscope.

12. The method as set forth in claim 10, wherein the image data is superimposed in an image inter-reflecting unit of a surgical microscope.

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13. The method as set forth in claim 12, wherein the alignment of the instrument is determined by means of a medical tracking system.

14. The method as set forth in claim 1, wherein the image data set is a high-resolution volume image data set of an internal area of the body.

15. The method as set forth in claim 14, wherein the image data set is a  
5 high-resolution x-ray image data set.

16. The method as set forth in claim 15, wherein the image data set is a rotational angiography image data set.

10 17. The method as set forth in claim 1, wherein the image data is converted to a three-dimensional representation of structures of the internal area of the body, which are then represented visually.

18. The method as set forth in claim 17, wherein the structures are  
15 vascular structures,